

Section R – PLUMBING INSTALLATION

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R.0 Compliance with Materials and Workmanship with the Building Regulations

In order to demonstrate conformity with the Building Regulations (Part D; Materials and Workmanship), and with the Construction Products Regulation (Regulation (EU) No.305/2011) and set out in national rules for Ireland (S.I.225 of 2013), the Contractor shall provide proof (a Declaration of performance (DoP)) and (where applicable) a CE marking for all building products to be placed in the works.

The Contractor shall ensure that the product to be incorporated in the works, while complying with CPR, is fit for the use for which it is intended. The Contractor may be required to demonstrate this by means of manufacturer's confirmation, or independent testing certificate.

GENERALLY

R.1 Regulations

All plumbing and sanitary installations shall comply with Irish Water and FCC Water Regulations and any other regulations that are in force at the time of construction.

R.2 Qualified Tradesmen

All plumbing and sanitary installations shall be carried out by qualified and competent tradesmen.

R.3 Setting Out

The position of all pipe runs including joints and connections shall be agreed with the Architect before any installation is commenced.

R.4 Pipework Generally

Pipework shall include for all necessary bends, fittings, expansion joints, etc., as appropriate and shall be firmly supported by clips or brackets all in accordance with good practice and the manufacturer's recommendations.

The Contractor shall provide all washers, jointing materials etc., necessary to obtain a watertight installation.

R.5 Copper Tubes

Copper tubes shall comply with the requirements of I.S EN 1057:2006 (+A1:2010) and bear the Irish Standard Mark. Manufacturers of the Copper tubes shall be licensed under the Irish Standard Mark Licensing Scheme of the N.S.A.I.

Manufacturers or suppliers shall certify that each delivery complies in all respects with the provisions of IS EN 1057:2006 (A1:2010) and copies of this certificate shall be submitted to the Architect on request.

R.6 Compression Tube Fittings

Compression tube fittings of copper and copper alloy, including stopcocks, gate valves, M.T. fittings and flanged tank connectors, shall comply with IS EN 1254-2:1998 and bear the Irish Standard Mark (Particular Regulations applicable to compression Tube Fittings of Copper Alloy Ref. 239/3).

Manufacturers or suppliers shall certify that each delivery complies in all respects with the provisions of IS EN 1254-2:1998 and copies of this certificate shall be submitted to the Architect on request.

R.7 Testing of Materials

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The Contractor shall allow for the pressure testing of Hot Water cylinders and for the testing of all other items in this section which the Architect may deem necessary, see Clauses A33/220 and A33/560.

Pressure testing shall be carried out in the presence of the Clerk of Works.

R.8 Thermal Envelope

In this section the expression “thermal envelope” shall mean the area of the building within the warm side of the insulation and Airtightness layer perimeter. E.g a cold attic space is deemed outside of the thermal envelope.

R.9 Pipe Fire Collars (Multi-Storey Housing)

All piping penetrations through fire compartment walls and floors must be fitted with an appropriate pipe fire collar that will prevent smoke and fire movement by closing off the aperture in the event of a fire. The fire collar must be constructed of corrosion resistant steel with a water resistant polymer intumescent material (Pipe collar B150 by fireseal.ie or equivalent and approved by FCC and local Fire Chief), and comply with IS EN 13501-3:2006 + (A1:2009) and BS 476-20:1987.

The collar should be sealed around to prevent the passage of smoke and fire through the walls and floors. Sealing should be Acrylic based (M701 Acrylic sealant by fireseal.ie or equivalent and approved by FCC and Local Fire Officer) and comply with IS EN 1366-3:2009.

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R.10 Plastic Gutters

Plastic gutters shall be as indicated on the drawings and shall be black in colour, complying with IS EN 12200-1:2000 and shall include all fittings and accessories required. Sizing and profile shape of the gutters shall be to the Architect's decision.

The Contractor's attention is drawn to tables 16 and 17 of Technical guidance document, Part H for calculations of drainage requirements.

R.11 Plastic Rainwater Pipes

Plastic rainwater pipes shall be 70mm square UPVC rainwater pipes ('Wavin Osma Amazon' or equivalent) and black in colour, complying with IS EN 12200-1:2000 and shall include all fittings and accessories required.

The Contractor's attention is drawn to tables 16 and 17 of Technical guidance document, Part H for calculations of drainage requirements.

R.12 Fixing of Plastic Gutters

Gutters are to be laid accurately to a continuous even fall of 1 in 600 minimum.

The gutters shall be supported at not more than 1 metre centres and strictly in accordance with the manufacturer's instructions. All fixings, seals and supports shall be as supplied or recommended by the manufacturer.

R.13 Fixing of Plastic Rainwater Pipes

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Rainwater pipes shall be fixed and jointed in accordance with the manufacturer's instructions except that brackets shall be spaced at not more than 1 metre centres. Brackets shall be secured to the wall with 10 gauge screws and plastic plugs.

R.14
to
R.19

Nil

R.20 **Aluminium Gutters**

Aluminium Gutters and fittings ('Alumasc Aqualine' or equivalent) to comply with to IS EN 755-1:2008, complete with all fittings and seals required. The gutters to be plain finish 100mm half round to houses and 120mm half round to apartments.

The Contractor's attention is drawn to tables 16 and 17 of Technical guidance document, Part H for calculations of drainage requirements.

R.21 **Aluminium Rainwater Pipes**

Aluminium rainwater pipes shall ('Alumasc Flushjoint' or equivalent) comply to IS EN 755-1:2008, including all fittings and accessories required.

Rainwater pipes to be round pipes of 76mm dia, 1.22mm min wall thickness, to houses and 102mm dia, 1.5mm min wall thickness, to apartments.

R.22 **Fixing of Aluminium Gutters**

Gutters are to be laid accurately to a continuous even fall of 1 in 600 minimum.

The gutters shall be supported with brackets at not more than 900 mm centres apart and strictly in accordance with the manufacturer's instructions. All fixings, seals and supports shall be as supplied or recommended by the manufacturer.

R.23 **Fixing of Aluminium Rainwater Pipes**

Rainwater pipes shall be fixed and jointed in accordance with the manufacturer's instructions with brackets spaced at not more than 2 meter centers apart and located near joints.

R.24 **Balcony Outlets**

Rain water outlets from balconies to be ('Harmer Balcony Outlets' or equivalent) 102mm rainwater pipes as Clause R.20.

R.25 **Testing**

Gutters and rain water pipes shall be tested with water in the presence of the Architect to ensure that there are no leaks, gutters are to correct falls and pipes are unobstructed.

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R.26 **Plastic Pipes, Fittings and Accessories**

Plastic soil and ventilating pipes and fittings shall be uPVC and comply with B.S. 4514:2001.

Plastic waste pipes and fittings shall be either MUPVC (Modified Unplasticised Polyvinyl Chloride) to IS EN 1329-1:1999 or PP to IS EN 1451-1:1999 or ABS (Acrylonitrile Butadiene Styrene) to IS EN 1455-1:1999 and complying with to BS 5255:1989 as appropriate.

Plastic overflow pipes for flushing cisterns shall be 22mm uPVC and shall drain to the exterior of the building.

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Unless otherwise agreed by the Architect, soil and vent pipes, waste pipes and traps shall be obtained from the same manufacturer.

R.27 Jointing of Pipes

All joints shall be perfectly smooth inside without excrescences.

Jointing of pipes and fittings above 50mm diameter shall be by sealing ring unless otherwise indicated in accordance with manufacturer's recommendations. All pipes of 50mm diameter or below shall be solvent welded in accordance with manufacturer's recommendations.

Pipework is to be assembled in a manner that does not entail making joints in restricted locations.

R.28 Cutting of Pipes

All pipes are to be accurately cut to the exact length required to penetrate fully into the fitting without causing bowing of the pipework or the displacement of adjoining pipework. Cuts are to be true and at right angles to the length of pipe. Cut ends are to be cleaned of all burrs and where ring connectors are being used the outside edge is to be filed to a taper.

R.29 Bends and Tees

All bends shall be sweep bends or easy right-angle bends. No elbows shall be used. All tees shall be swept tees. Provide cleaning eyes on elbows and tees to soil stack.

R.30 Nil

R.31 Support and Fixing of Pipework

Unless otherwise described, the fixing of brackets and supports and the frequency of their spacing shall be in accordance with the manufacturer's recommendations, plugged and screwed to the structure with galvanised screws. All steel brackets and support shall be plastics coated or galvanised.

R.32 Falls

All pipework to be laid to adequate falls sufficient to ensure complete drainage of pipes. The Contractor's attention is drawn to Technical Guidance Document, Part H: Drainage and Waste Water Disposal.

R.33 Soil Vent Pipes

Connect soil vent pipe at roof level with a flexible connector properly fixed and supported and not to exceed one metre in length, to a tile vent terminal ('Glidevale Type G6' or equivalent).

Where specified, Air admittance valve (AAV) soil pipes shall remain vertical and shall rise above the level of the nearest sanitary appliance.

All AAVs are to comply with IS EN 12380:2002 and the requirements set out in Technical Guidance Document Part H; Drainage and Waste Water Disposal.

R.34 Waste Pipes

Waste pipes to sink shall be 40mm nominal and to wash hand basin shall be 32mm nominal both fitted with 76mm bottle traps to IS EN 274-1:2002.

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Waste pipe to washing machine shall be a 32mm outlet stand-pipe finishing 600 minimum above finished floor level. Stand-pipe is to be trapped and connected by reducer to the 100mm bend and back inlet gully serving the kitchen sink.

Waste pipe to bath shall be 40mm nominal fitted with 76mm 'P' Trap to IS EN 274-1:2002 complete with 22mm flexible overflow connection.

R.35
to
R.40

Nil

R.41

Testing

The Contractor shall from time to time as required to suit the progress of the building work test the plumbing and internal drainage in sections, in the presence of the Architect, before any such work is covered. At the completion of the works all soil pipes and branches and waste pipes and other parts of the internal drainage works connected directly with any sewage drain or sewage drain ventilating pipe or soil pipe, shall be closed at each end and air shall be blown into the system until a pressure of 38mm is indicated on the water gauge. Without introducing further pressure the reading on the gauge shall remain constant for a period of 3 minutes.

The Architect may also direct that a smoke or any other test be applied to any other parts of the drainage or ventilating system as he thinks desirable, and everything necessary for these tests shall be supplied by the Contractor.

R.42

Cleaning

On completion of the works, immediately before handing over, the Contractor shall thoroughly cleanse the whole of the system and ensure that it is functioning freely.

SANITARY FITTINGS

R.43

Supplies

Sanitary fittings shall be supplied by an approved firm from whom the Contractor shall obtain a guarantee that the fittings will be delivered to the site at such dates as the Contractor considers necessary for the completion of the works within the contract period.

Sanitary Fittings shall include all fittings and accessories and shall be to the Architects' approval.

The Contractors attention is drawn to the specialist nature of the fittings used and should allow for extended delivery times which may occur.

R.44

Quality

Ceramic fittings shall be of Vitreous China to BS 3402:1969 fired at such a temperature as to produce a satisfactory permanent fused or vitrified glaze and shall be sound and of good workmanship without manufacturing faults.

The glaze shall be uniform, free from discolouration and possess an impervious surface.

Stainless steel fittings shall be formed from Stainless Steel complying with IS EN 10088-1:2005.

R.45

Nil

R.46

Stainless Steel W.C. Pan

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Where specified, stainless steel W.C. pans shall be shrouded floor mounted pan with 'P' Trap suitable for fixing to 110 mm wall. The pan shall comply with IS EN 997:2012 with the particular compliance with Section 5 (Flushing requirements) ('Sissons 'Guardian' WC pan' or 'Associated Metal 'Rotterdam' WC pan or equivalent). Provide earthing lug with brass screw.

Suite to be supplied complete with standard thermoplastic seat and cover to BS 1254:1981.

R.47 **Concealed Low Level Flushing Cistern**

Where specified, concealed low level flushing cisterns shall be ('Armitage Shanks Conceala' or equivalent) a moulded thermoplastic dual flush cistern of 6 litre capacity for use with back to wall pan and be fitted with a flush valve as Clause R.49.

Flushing operation shall be by means of a C.P. palm push button and linkage ("Armitage Shanks Ref: 7633A9D.CP" or equivalent).

R.48 **Vitreous China W.C. Suite**

Low level WC's shall be a close coupled vitreous china W.C. suite, colour white, consisting of pan, and matching approved dual flush cistern of 6 litre capacity complying with IS EN 997:2012.

The cistern must have an indelible six litre water level mark. Internal overflows will only be allowed under certain circumstances with prior permission of the Architect. Flush valve to be as Clause R.49.

Suite to be supplied complete with standard thermoplastic seat and cover to BS 1254:1981.

R.49 **Ball valves and floats for cisterns**

All flushing valves shall be 13mm piston type ball valves with brass body to BS 1212-4:1991 with silencing pipe and 115 mm ball float.

R.50 **Nil**

R.51 **Stainless Steel wash hand basin**

Where specified, stainless steel wash hand basins to be fully skirted purpose made units, of approved manufacture, with 400 dia x 165mm deep minimum size bowls and 40mm upstands at wall. The unit to have cast concrete backing as shown on the detailed drawings and be complete with earthing lug with brass screw.

Basin to be supplied complete with 32mm waste, plug and chain.

R.52 **Stainless Steel sink unit**

Where specified stainless steel sink units shall be fully skirted purpose made units, of approved manufacture, fabricated from 0.83mm (minimum thickness) austenitic stainless steel complying with IS EN 10088-1:2005 with a minimum bowl size of 380 x 340 x 180 mm deep handed as appropriate and with 40mm upstands at wall. Where specified, the unit shall have cast concrete backing as shown on the detailed drawings and be complete with earthing lug with brass screw. two tap holes, 40mm chromium plated waste outlet, plug and chain.

R.53 **Stainless Steel inset sink top for timber base units**

Stainless steel sink tops for fitting to timber base units in houses shall be complying with IS EN 13310:2003 or an equivalent standard. They shall be manufactured from 0.83mm (minimum thickness) austenitic stainless steel complying with IS EN 10088-1:2005 with a minimum bowl size of 380 x 340 x 180 mm deep handed as appropriate, and be complete with earthing lug with brass screw, two tap holes, 40mm chromium plated waste outlet, plug and chain.

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R.54 Vitreous china wash hand basin

Vitreous china wash hand basin shall be a white wash basin to BS 3402:1969 of approved manufacture supplied complete with 32mm waste, plug and chain.

Basins to Ground Floor WC's to be 365 x 255mm in size and basins to Bathrooms 560 x 405mm or as otherwise indicated.

R.55 Baths

Baths shall be either white porcelain-enamelled cast iron with slip-resistant base complying with I.S. 156:1984 or white vitreous enamelled steel sheet with slip resistant base of 1.6mm minimum thickness complying with IS EN 232:2012. The bath shall be 1700 x 700 in size and supplied with adjustable feet, 32mm chromium plated overflow outlet, and two end tap holes, earthing lug with brass screw, 40mm chromium plated waste outlet, plug and chain.

R.56 Glazed Fireclay 'Belfast' Sink

Where specified, glazed fireclay 'Belfast' sink, 610 x 455 x 255mm, complying with BS 1206:1974 of approved manufacture supplied complete with 40mm waste, plug and chain.

R.57 Level Access Showers

Level access shower tray to be sized as indicated on the drawings for one bedroom and specially adapted dwellings and as otherwise specified. ('Chiltern', 'Neatdek' or 'EASA' shower trays or equivalent). Shower set to include appropriately sized carer's screen, floor seal and skirting kit from the same manufacturer.

Provide a permanent watertight seal between the wall and the edges of the shower (see clause T.114).

For flooring see clause T.126

R.58 Assembling and Installation of Sanitary Fittings

Sanitary fittings shall be assembled in accordance with the manufacturer's instructions and unless otherwise described installed in accordance with BS 6465-1:2006 (A1:2009) and BS 6465-3:2006.

Stainless Steel W.C. pans shall be fixed by bolting or clamped through the service duct wall in accordance with manufacturers recommendations.

Vitreous china W.C. pans shall be fixed to the floor with 12 gauge brass screws 53mm long plugged in concrete.

Baths shall be properly leveled when installed and bearing plates provided under bath feet to protect and spread load on timber floors. The rim of the bath shall be horizontal and care taken to provide a permanent watertight seal between the wall and the edges of the bath (see clause T.115).

Taps to sinks, basins and baths shall be fixed in accordance with the manufacturer's instructions and form a watertight seal with the fitting. Where fitted to stainless steel sinks and basins with concrete surround 100mm long parallel nipples are to be used to extend tap through concrete base.

Waste Fittings to sinks, basins, bowls and baths shall be bedded in a waterproof jointing compound recommended by the manufacturer and secured with a backnut, including polythene washers between the backnut and the sanitary fitting, to provide a watertight seal.

Flush Pipes shall be fixed to flushing cistern by union nut and to W.C. pan by rubber cone connector, all in accordance with the manufacturer's instructions, to provide a watertight seal.

Overflows, which shall be fitted to all cisterns, shall be suitable for coupling to the type of pipe described and permit easy dismounting of the flushing cistern, shall be connected to the fitting in

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accordance with the manufacturer's instructions including all washers, "P.T.F.E." tape necessary to provide a watertight seal.

Composite Stainless Steel/Concrete sink and basin units to service blocks shall be bedded in 1:3 cement/sand mortar to supporting walls and the joint between wall and unit sealed with a silicone sealant in accordance with Clause G.26.

R.59 Testing

On completion test the whole of the fittings to prove that they operate freely and leave in a clean and serviceable conditions.

COLD AND HOT WATER INSTALLATION

R.60 Copper Pipe and Fittings

See clauses R.5 and R.6.

R.61 Nil

R.62 Indirect hot water cylinders

The domestic hot water cylinder shall have a capacity of 136 litres. It shall comply with BS 1566-1:2002 + (A1:2011) and be factory insulated with CFC and HCFC-free insulation. It shall have a threaded connection to allow for a top entry electric immersion heater in accordance with IS 60335-2-73:2003 + (A2:2009). The cylinder shall be fitted with a high efficiency, finned copper coil which shall give a reasonable recovery time. A strap on cylinder thermostat will be installed approximately $\frac{1}{4}$ the way up the cylinder to control the domestic hot water temperature (See also Electrical Specification for details of high limit thermostat).

The primary supply and return pipes at the coil shall have a minimum diameter of 22mm, the return primary shall be fitted with a lockshield balancing valve for adjustment when commissioning. Cylinders shall be fitted with a suitably located drain valve. The cylinder shall be tank fed from the cold water storage tank and shall vent back to that tank.

In situations where sufficient space cannot be provided for a cold water storage tank of adequate size i.e. apartments and duplexes, or, where otherwise directed by the Architect, a combination hot and cold water storage tank of an approved type and size (Coppercraft Ltd or equivalent and approved by FCC Mechanical Inspector). The combination tank shall be connected in accordance with the manufacturer's instructions and shall comply with all aspects of BS 1566-1:2002 + (A1:2011) and with Water Authority regulations. Tanks shall be fitted with a suitably located drain valve. The tank shall be fitted with a high efficiency, finned copper coil and shall be provided with a 1.5 bar, twin brass impellers, single phase, negative head pump. The cold water section shall have a threaded connection to allow for a dedicated cold water supply to the toilet system.

R.63 Water Storage Tank

Cold water storage tanks shall be black moulded polythene tanks complying with BS 4213:2004 complete with lid as Clause B110

All connections to tanks shall be made with brass locknut unions and ball valves shall be 13mm piston type with brass body complying with BS 1212-1:1990.

Tanks to 3 bedroom houses shall have a minimum actual capacity of 273 litres (60 gal) ("ROM Plastics Ltd. ref. 80/60" or equivalent). Tanks to 4 bedroom houses shall have a minimum actual capacity of 363 litres (80 gal). Two no.182 litre tank connected in series would be acceptable. Note: connected by a pipe between the two tanks at a low level and must NOT have both ball valve and draw off pipe in the same tank.

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Feed and expansion tanks for central heating to be of 18 litres (4 gal) actual capacity ("ROM Plastics Ltd. ref. 10/4" or equivalent).

All water storage tanks installed in attic spaces are to be properly insulated with purpose made jackets as Clause R.76. All water storage tanks shall have mounted lids.

Attic insulation must not be placed under storage tanks, unless the tank is raised beyond the top of the ceiling joists to give additional pressure head, in which case, the tank should be fully enclosed in insulation and the ceiling insulation carried through underneath. (See clause 1.9.2 and Diagram 3 of TGD, Part G: Hygiene)

R.64 Stop and Bib Cocks

All stop and bib cocks shall comply with IS EN 1213:2000 and be of approved manufacture. Number and type of valves shall be as indicated on the drawings. Under no circumstances will gate valves be permitted on the rising mains water supply.

R.65 Taps and Shower Fittings to Sanitary Fittings

Unless otherwise described draw-off taps shall be of chromium plated brass with chromium plated brass tapheads. Samples of all taps, shower fittings and equipment shall be provided on site by the Contractor for the Architects selection and approval and shall be approved before installation. Taps and shower fittings to bathrooms and WC's shall be of a matching suite. All to be installed in accordance with the manufacturers recommendations.

Draw-off taps, shower fittings etc. shall be provided as follows:-

1. Houses	
Hot and Cold Taps to Sink:	Dual flow deck mounted mixer taps with swivel spout complying with IS EN 200:2008 and WRC approved.
Hot and Cold Taps to Wash hand basins:	Pillar taps.
Hot and Cold Taps to Bath:	19mm mono deck mounted bath/shower mixer taps complying with IS EN 200: 2008 and WRC approved.
Shower fittings: (Over Bath only)	Bath/shower to be supplied complete with matching 1350mm shower hose, handset with removable spray head and wall mounted swivel holder. Provide shower rails as per Clause N.135.
Shower fittings: (Level Access only)	Provide electric shower unit as per clause 7.20 of 'F.S.S.1 – Specification for Electrical Installation in Houses'. Provide shower rails as per Clause N.135.

2. Service Blocks	
Hot and Cold taps to basins:	12mm high neck cross head pillar taps complying with IS EN 200:2008 and WRC approved.
Hot tap to sink:	As above.
Cold taps to sinks:	12mm bib cock with hose union and mounted on 150mm high bib

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	tap standard. All with C.P. finish and complying with IS EN 200:2008 and WRC approved.
Shower fittings:	See Clause R.67 below.

R.66 **Combination Hot & Cold Water Tanks (Apartments and Duplex units)**

Combination hot and cold water storage tanks of an approved type and size, (manufactured by Coppercraft Ltd, or equivalent) are to be used in apartments and duplex units. Combination tanks shall have a minimum cold capacity of 226 litres and minimum hot capacity of 136 litres. The combination tank shall be connected in accordance with the manufacturer's instructions and shall comply with all aspects of IS 3198:1981 and with Fingal County Council Water Bylaws 2004. Tanks shall be factory insulated and have a threaded connection to allow for an electric immersion heater. Tanks shall be fitted with a suitably located drain valve. The tank shall be fitted with a high efficiency, finned copper coil and shall be provided with a 1.5 bar, twin impeller, single phase, negative head pump.

The cold water section shall have a threaded connection to allow for a dedicated cold water supply to the toilet cistern.

R.67 **Shower Fittings (where specified)**

Shower equipment to be provided and installed:-

- (i) Thermostatic mixing valve ('MIRA Magni-Flo' or equivalent).
- (ii) Concealed time flow push button control ("MIRA No. T503" complete with "MIRA.AD31" extension spindle assembly or equivalent).
- (iii) Shower head shall be fixed, ('MIRA Nectar four spray showerhead' or equivalent), a minimum 2 metres above floor level.
- (iv) Fitted with brass impellers (Grundfos, Wilo or equivalent and approved by the FCC mechanical inspector).
- (v) Shower pump to be minimum 1.5 Bar twin automatic, heavy duty, brass bodied pump designed for a negative head of approved manufacture. Electrical connections to be as specified in Section S - Electrical Installation.
- (vi) Shower rail as Clause N.135.

All shower fittings and equipment to be approved before installation and to be installed in accordance with the manufacturers recommendations.

The pump shall be installed between the mixer and timeflow control button and the contractor shall ensure that the flow direction of the pump is correctly aligned.

R.68 **Washing Machine**

Make plumbing provisions for a standard washing machine to be installed at a later date by the occupants. Include separate 13mm cold feed (not rising main) and install stop-cocks and blank ends on hot and cold feeds threaded for standard washing machine hose connections.

Where combination tank is used the washing machine shall be supplied by separate hot and cold feeds from cylinder and fitted with pressure reducing valves to each supply.

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R.69 **Pipework Generally**

Pipework to fittings shall be neatly run in a manner approved by the Architect.

All connections and fittings shall as far as practicable be in such a position as will allow for removal and replacement.

Pipework shall not be laid perfectly horizontal but with a slight fall so as to be easily drained.

All pipes are to be accurately cut to the exact length required to penetrate fully into the fitting. Cuts are to be true and at right angles to the length of the pipe. Cut ends are to be cleaned of all burrs.

All stop cocks and gate valves must be positioned to allow immediate access to them.

R.70 **Fixing of Pipework**

Pipework shall be fixed with standard copper, brass or plastic clips or holderbats screwed to timber backgrounds. Where secured to concrete, brickwork or blockwork they shall be fixed with standard brass or plastic holderbats, in two pieces screwed together and held off the wall.

Fixings shall be spaced at not more than 1.2 metres centres horizontally or 1.8 metre centres vertically.

All exposed pipework to be boxed-in unless otherwise specified.

R.71 **Distribution piping in Service Blocks**

Rising main: Carry up 13mm H.D. polythene as Clause R/WM/5, rising main to kitchen sink and then to cold water storage tank and connect to ball valve.

Cold feeds from CWT: Carry 13mm copper cold feed, fitted with gate valve, near C.W.T., to W.H.B. with branch to W.C.

Carry separate 19mm copper cold feed to shower mixer fitted with gate valve near C.W.T.

Carry 19mm copper feed to bottom of H.W. cylinder fitted with gate valve near C.W.T.

Hot feed from HW Cylinder: Carry 19mm copper feed and expansion pipe from highest point of cylinder rising to a horizontal length of piping no less than 300mm min which shall then split into two pipes one proceeding into roof space and turning down to discharge below rim of C.W.T. and the other to act as the hot water distribution pipe.

Take separate 13mm branches to shower, sink and W.H.B.

Provide a draw-off cock at the lowest point of the hot water system.

Ensure all draw-off points from the cold water tank are fitted at the opposite end of the tank from the rising main.

R.72 **Distribution piping in Caretakers Office**

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Carry up 13mm copper cold feed to W.H.B., from stop cock, with branches to under sink water heater and W.C. cistern.

For details of under sink water heater see Section S: Electrical Services.

R.73 Distribution piping in Houses

- Rising Main: Carry up 13mm H.D. polythene as Clause R/WM/5, rising main to kitchen sink and then to cold water storage tank and connect to ball valve.
- Cold Feeds from C.W.T: Carry 19mm copper cold feed, fitted with gate valve at an accessible level (no greater than 1800mm above the finished floor level) in hot press, to bath with 13mm branches to W.H.B. and W.C.
- Carry separate 19mm cold feed to bottom of H.W. Cylinder and fitted with gate valve at an accessible level (no greater than 1800mm above the finished floor level) in hot press.
- Hot Feed from H.W. Cylinder: Carry 19mm copper feed and expansion pipe from highest point of cylinder rising to highest point in roof space and turning down to discharge below rim of C.W.T.
- Take separate 13mm branches to sink and W.H.B. and 19mm branch to bath.
- Provide a draw-off cock at the lowest point of the hot water system.
- Ensure all draw-off points from the cold water tank are fitted at the opposite end of the tank from the rising main.

R.74 Overflows to Service Blocks

Provide 19mm copper overflow pipes, with chromium plated dribbler fitting, to cold water storage tanks and W.C. cisterns all to discharge at low level into shower tray as drawn detail. All overflows to have sufficient fall to empty pipe, and shall be properly supported and clipped as Clause R.70.

R.75 Overflows to Houses

Provide 19mm uPVC black overflow pipes to cold water storage tanks and W.C. cisterns all to discharge to the outside. Overflow from C.W.T. to discharge 75mm below soffit. All overflows to have sufficient fall to empty pipe, and shall be properly supported and clipped as Clause R.70.

R.76 Insulation

Cold water storage tanks to be insulated ('Talsen' Universal Attic Tank Jacket or equivalent), Tank to be provided with rigid purpose made lid, 12mm plywood or equal and approved to support tank jacket. Sample to be approved by Architect.

All hot water cylinders and combination tanks to be factory insulated.

Pipework laid in floor screed or floor slab it shall be insulated with open cell pipe insulation of 13 mm wall thickness ('Aerotube' or equivalent). Ensure pipes are completely covered and insulation is cut to properly fit around brackets, fittings and valves. All joints on the insulation shall be tight and taped.

Where pipework is located in attic spaces it shall be insulated with closed cell pipe insulation of 22 mm wall thickness closed cell insulation. Ensure pipes are completely covered and insulation is cut to properly fit around brackets, fittings and valves. All joints on the insulation shall be tight and taped.

All pipes outside the thermal envelope of the building, including overflow pipes shall be insulated in accordance with Table 3 of BS 5422:2009 (reproduced in TGD Part G: Hygiene as Table1).

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R.77 Testing

Provide for testing foregoing plumbing work to the satisfaction of the Architect. All leaking connections and defective pipes shall be taken out and replaced with new and then again tested to the satisfaction of the Architect.

R.78 Attendance

Provide for all attendance breaking or leaving holes, making chases, and making good all trades in connection with plumbing work.

WATERMAINS

DISTRIBUTION MAIN

R.79 Generally

Distribution mains shall generally be in accordance with the 'Specification for Housing Development Works' and as shown on the drawings, unless otherwise specified.

R.80 Distribution Pipework

Distribution pipework shall generally, unless otherwise indicated, be MOPVC pipes conforming to the UK Water Industry Specification No. 4-31-08 or equivalent EU Specification and manufacturers shall operate a quality system in compliance with IS EN ISO 3994:2011. Colour of pipework to be in accordance with IS 370:2007.

Where passing under roads distribution pipework shall be ductile iron pipes conforming to Class K9 of IS EN 545:2010. Ductile iron pipes and fittings shall be cement mortar lined with sulphate resistant cement and shall be sealed with an approved bitumen or epoxy resin sealcoat.

R.81
To
R.88

Nil

SERVICE MAINS (House Connections)

R.89 Trenches

Trenches shall be excavated and backfilled as described in Section 'D' and shall be of sufficient depth and width for the water mains to be not less than 750mm below the finished surface of the ground and to allow the required backfilling.

R.90 Ducts

Provide 100mm diameter uP.V.C. ducts complying with IS 123:1964 Type 32 for water mains where passing through walls or under buildings when they shall be laid with concrete surround as described in Drainage, Section W. Where duct passes through floor slabs seal off around service pipe to prevent access by vermin.

Where the water main rises inside the external wall of the building, pipe within the duct shall be insulated with insulation impermeable to water vapour. The insulation shall be continuous from the outside face of the wall to the point where the rising main enters the thermal envelope of the building. Where the floor is a solid, ground-bearing slab, the pipe shall be insulated where it rises

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within 600mm of the outside face of the external wall. Where the floor is suspended the duct shall be insulated irrespective of the distance to the outside.

The DPM/vapour barrier shall be sealed around the duct. (See Diagrams 1 and 2 of TGD Part G: Hygiene)

R.91 **Nil**

R.92 **Levels**

Underground pipes shall be not less than 750mm below finished ground level and shall enter the building at the level at which they are buried.

R.93 **Polyethylene Pipes and Fittings**

High Density polyethylene pipes shall comply with IS 134:1977.

Fittings shall be compression fittings to IS EN 1254-3:1998.

Pipes shall be jointed and installed in accordance with the manufacturer's instructions.

R.94 **Boundary Boxes (Stopcock chambers)**

Boundary Boxes to be a sealed meter box system with telescopic body and circular plastic lid, ('Talbot Matrix' or equivalent), complete with shut-off valve, non- return valve and push fit outlets.

The unit shall have a minimum loadbearing capacity of a 5 ton wheel load and the minimum depth from base to lid shall be 500mm.

R.95 **Nil**

R.96 **Connection to distribution main**

Provide for tappings to the distribution main in accordance with Clause B.27 and table R.I. below. Tappings shall include for patent brass ferrule with polythene pipe connection to stopcock, as Clause R.64, which shall be positioned in the footpath or concrete apron in front of each house, caravan bay, fire point etc.

TABLE R.I	
Location	Size of Tapping
Houses	1 No. 13mm per house
Service Blocks (Travellers sites only)	1 No. 13mm per Unit
Caretakers Unit/ Pump Room (Service blocks only)	1 No. 13mm
Community Centre	2 No. 13mm
Fire Hose Reel Points	1 No. 25mm per reel

R.97 **Connection of service mains**

Lay an independent water service to each house etc. with approved 13mm high density polythene tube, in a continuous length, as above and connect to stopcock. Cover for pipe shall not be less than 750mm unless specially protected and in any event shall be surrounded in 100mm sand. The supply shall be tested before filling in trenches. The service pipe shall enter the building at the levels at

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which it is buried in the ground and rise at a convenient place within the building away from external walls and without any joint occurring underneath the floor i.e. the rising main shall be continuous between the boundary box and internal stopcock.

Provide and fix 13mm gunmetal fullway screwdown stopcock to IS EN 1213:2000 fixed over floor level inside each unit in a position to be decided by the Architect on the job.

Service to fire points shall be in 25mm copper pipe insulated as Clause R.76 and surrounded in concrete above ground level and connected to hose reel in accordance with manufacturer's instructions. Pipe above ground to be insulated in accordance with Clause R.76.

R.98 **Procedure for Water Connections**

The following procedures must be followed in regard to all water connections.

1. After the water main has been laid the main shall be tested in the presence of an inspector, supervising inspector from the relevant Water Depot.
2. Then the test has been passed the main will be connected to the County Council main by the Fingal County Council Water Services Division. It will also be swabbed and chlorinated at this stage. All excavation work shall be carried out by the Contractor. Adequate notice will be required before this work can be done.
3. The area water inspector will then make the individual house connections to the main. On no account must any tapplings be made to the watermain by any other party than Fingal County Council, Water Services Division.

For further procedures on water connections see Appendix 'C', Section B.

R.99 **Nil**

R.100 **Testing**

All mains and service pipework shall be cleaned out prior to testing. The mains and service pipework installations shall be subjected to a hydraulic test pressure of 1½ times the maximum working pressure. The pressure shall be maintained without measurable loss for 30 minutes. Installations or sections thereof which are to be either wrapped, embedded in the structure or concealed in permanently sealed ducts or trenches, shall in addition to the above specified test be similarly tested as they are laid and before being wrapped, embedded or concealed.

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Appendix A: List of References and Standards. (Part 1)

Item No.	Clause.	Reference	Comment
1.	R.5	IS EN 1057:2006 (+A1:2010)	Copper and copper alloys seamless, round copper tubes for water and gas in sanitary and heating applications.
2.	R.6	IS EN 1254-2:1998	Copper and copper alloys – Plumbing fittings – Part 2: Fittings with compression ends for use with copper tubes.
3.	R.9	13501-3:2006 (+A1:2009)	Fire classification of construction products and building elements – Part 3 Classification using data from fire resistance tests on products and elements used in building service installations: Fire resisting ducts and fire dampers.
4.	R.9	BS 476-20:1987	Fire tests on building materials and structures – Method for determination of the fire resistance of elements of construction (general principles)
5.	R.9	IS EN 1366-6:2009	Fire resistance test for services installations – Part 3: Penetration seals.
6.	R.10	IS EN 12200-1:2000	Plastics rainwater piping systems for above ground external use – Unplasticised Poly (Vinyl Chloride) (PVS-U) – Part 1: Specifications for pipes, fittings and the system.
7.	R.20	IS EN 755-1:2008	Aluminium and aluminium alloys – Extruded rod/bar, tube and profiles – Part 1: Technical conditions for inspection and delivery.
8.	R.26	BS 4514:2001	Unplasticised PVC soil and ventilating pipes of 82.4mm minimum mean outside diameter, and fittings and accessories of 82.4mm and of other sizes – Specification.
9.	R.26	IS EN 1329-1:1999	Plastics piping systems for soil and waste discharge (low and high temperature) within the building structure – Unplasticised Poly(Vinyl Chloride)(PVC-U) – Part 1 – Specification for pipes, fittings and the system.
10.	R.26	IS EN 1451-1:1999	Plastics piping systems for soil and waste drainage (low and high temperature) within the building structure – Polypropylene (PP) – Specifications for pipes, fittings and the system.

Appendix A: List of References and Standards. (Part 2)

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Item No.	Clause.	Reference	Comment
11.	R.26	IS EN 1455-1:1999	Plastics piping for soil and waste (low and high temperature) within the building structure. Part 1: Acrylonitrile-butadiene-styrene (ABS) – Specifications for pipes, fittings and the system. (partially replaces BS 5255:1989)
12.	R.26	BS 5255:1989	Specification for thermoplastics waste pipe and fittings (still current except in areas where standard is partially superseded)
13.	R.33	IS EN 12380:2002	Air admittance values for drainage systems – Requirements, test, methods and evaluation of conformity.
14.	R.33	Technical Guidance Document Part H:2010	'Drainage and Waste Water disposal' www.environ.ie
15.	R.34	IS EN 274-1:2002	Waste fittings for sanitary appliances – Part 1: Requirements.
16.	R.44	BS 3402:1969	Specification for quality of vitreous china sanitary appliances.
17.	R.44	IS EN 10088-1 :2005	Stainless steels – Part 1: List of stainless steels.
18.	R.46	IS EN 997:2012	WC pans and WC suites with integral traps. (to replace IS EN 997:2003)
19.	R.46	BS 1254:1981	Specification for WC seats (Plastics)
20.	R.49	BS 1212-4:1991	Float operated valves – Part 4: Specification for compact type float operated valves for WC flushing cisterns. (including floats)
21.	R.53	IS EN 13310:2003	Kitchen sink – Functional requirements and test methods.
22.	R.55	IS 156:1984	Cast iron baths.
23.	R.55	IS EN 232:2012	Baths – Connecting dimensions (to replace IS EN 232:2003)
24.	R.56	BS 1206:1974	Specification for fireclay sinks: Dimensions and workmanship.

Appendix A: List of References and Standards. (Part 3)

Section R – PLUMBING INSTALLATION

Item No.	Clause	Reference	Comment
25.	R.58	BS 6465-1:2006(+A1:2009) BS 6465-3:2006	Sanitary installations – Part 1: Code of Practice for the design of sanitary facilities and scales of provision of sanitary and associated appliances Sanitary installations – Part 3: Code of Practice for the selection, installation and maintenance of sanitary and associated appliances.
26.	R.62	BS 1566-1:2002+(A1:2011)	Copper indirect cylinders for domestic purposes – Open vented copper cylinders. Requirements and test methods. (to replace 161)
27.	R.62	IS EN 60335-2-73:2003 + (A2:2009)	Household and similar electrical appliances – Safety – Part 2-73: Particular requirements for fixed immersion heaters.
28.	R.63	BS 4213:2004	Cisterns for domestic use – Cold water storage and combined feed and expansion (thermoplastic) cisterns up to 500 litres – Specification.
29.	R.64	IS EN 1213:2000	Building valves – Copper alloy stop valves for potable water supply in buildings – tests and requirements. (to replace BS 1010-2:1973)
30.	R.65	IS EN 200:2008	Sanitary tapware – Single taps and combination taps for water supply systems of type 1 and type 2 – General technical specification.
31.	R.66	BS 3198:1981	Specification for copper hot water storage combination units for domestic purposes. (to replace IS 161:1975)
32.	R.76	BS 5422:2009	Method for specifying thermal insulating materials for pipes, tanks, vessels, ductwork and equipment operating within the temperature range -40°C to +700°C.
33.	R.80	IS EN 3994:2011	Plastics hoses – Helical – Thermoplastic – reinforced thermoplastics hoses for suction and discharge of aqueous materials – Specification.
34.	R.80	IS 370:2007	Colour code for buried plastics piping.
35.	R.80	IS EN 545:2010	Ductile iron pipes, fittings, accessories and their joints for water pipelines – Requirements and test methods. (to replace IS EN 545:2006)

Appendix A: List of References and Standards. (Part 4)

Item No.	Clause	Reference	Comment
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36.	R.90	IS 123:1964	Unplasticised PVC pipe for cold water supply.
37.	R.93	IS 134:1977	Polyethylene pipe type 32.
38.	R.93	IS EN 1254-3:1998	Copper and copper alloys – plumbing fittings – Part 3: Fittings with compression end for use with plastic pipes.

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Appendix B: Amendments list	
Date of Amendments	Amendments
1/05/2014	This section was amended by Barry Sheils and approved by David Byrne, Senior Architect, Fingal County Council.